K103716

Elecsys Folate RBC Test System (including Folate RBC Assay (Rack Pack), the Folate RBC CalSet and the Folate RBC CalCheck)

MAY 12 2011

# 510(k) Summary

**Introduction**

According to the requirements of 21 CFR 807.92, the following information provides sufficient detail to understand the basis for a determination of substantial equivalence.

**Submitter name, address, contact**

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Date Prepared: December 20, 2010

Elecsys Folate RBC Test System (including Folate RBC Assay (Rack Pack), the Folate RBC CalSet and the Folate RBC CalCheck)

**Device Name and Device Descriptions**

Proprietary names: (1) Elecsys Folate RBC Assay
(2) Elecsys Folate RBC CalSet
(3) Elecsys Folate RBC CalCheck

Common names: (1) Folate RBC Assay
(2) Folate RBC CalSet
(3) Folate RBC CalCheck

Classification names: (1) Folic Acid Test System
(2) Calibrator, Secondary
(3) Quality Control Material (Assayed and Unassayed)

Product codes: (1) CGN
(2) JIT
(3) JJX

(1) The Elecsys Folate RBC assay employs a competitive test principle using natural folate binding protein specific for folate. Manually prepared hemolysate samples are used with this assay. Folate in the sample competes with the added folate (labeled with biotin) for the binding sites on folate binding protein (labeled with ruthenium complex). Results are determined via a calibration curve which is instrument-specifically generated by 2-point calibration and a master curve provided via the reagent barcode encoded on the reagent packaging.

(2) The Elecsys Folate RBC CalSet is a lyophilized product consisting of human serum with folate in two concentration ranges. During manufacture, the analyte is spiked into the matrix. This calibrator is used to calibrate the Elecsys Folate RBC assay.

(3) The Elecsys Folate RBC CalCheck is a lyophilized product consisting of a hemolysate with folic acid. During manufacture, the analyte is spiked into the matrix. This solution is used to verify the calibration established with the Elecsys Folate RBC CalSet.

Elecsys Folate RBC Test System (including Folate RBC Assay (Rack Pack), the Folate RBC CalSet and the Folate RBC CalCheck)

**Intended use**

**Folate RBC Assay:**

Binding assay for the in vitro quantitative determination of folate erythrocytes (red blood cells, RBCs). The binding assay is intended for use on Elecsys and cobas e immunoassay analyzers.

**Folate RBC CalSet:**

The Elecsys Folate RBC CalSet is used for calibrating the quantitative Elecsys Folate RBC assay on the Elecsys and cobas e immunoassay analyzers.

**Folate RBC CalCheck:**

Elecsys Folate RBC CalCheck is used for the verification of the calibration established by the Elecsys Folate RBC reagent on the indicated Elecsys and cobas e immunoassay analyzers.

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**Indications for Use**

**Folate RBC Assay:**

Measurements obtained by this assay are used in the diagnosis and treatment of anemias.

**Folate RBC CalSet:**

Elecsys Folate RBC CalSet is used for calibrating the quantitative Elecsys Folate RBC assay on the Elecsys and cobas e immunoassay analyzers.

**Folate RBC CalCheck:**

Elecsys Folate RBC CalCheck is used for the verification of the calibration established by the Elecsys Folate RBC reagent on the indicated Elecsys and cobas e immunoassay analyzers. For in vitro diagnostic use.

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**Substantial equivalence**

The Elecsys Folate RBC Test System is substantially equivalent to the Elecsys RBC Folate III Test System. This test system was previously cleared in K082340.

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## 510(k) Summary, Continued

**Substantial equivalence – comparison**

| (1) Elecsys Folate RBC Assay | | |
|---|---|---|
| **Feature** | **Elecsys Folate RBC Assay** | **Predicate Device: Elecsys RBC Folate III Assay (K082340)** |
| Intended Use | Elecsys Folate RBC binding assay is used **for the in vitro quantitative determination of folate in erythrocytes** (red blood cells, RBC). The assay is intended for use on Elecsys and cobas e immunoassay analyzers. | Elecsys RBC Folate Hemolyzing Reagent is used together with the Elecsys Folate III assay **for the quantitative determination of folate in erythrocytes** (Red blood cell folate; RBC folate) on the Elecsys 2010 and cobas e 411 immunoassay analyzers. |
| Indication for Use | Same | This assay may be used as an aid in the diagnosis and treatment of anemias. |
| Assay Protocol | Same | Electrochemiluminescent Immunoassay |
| Sample Type | Same | Na-Heparin and K3-EDTA |
| Labeled Instrument Platform | Roche Elecsys 2010/ **cobas e** 411 and Modular E170/cobas e 601/602 analyzers | Roche Elecsys 2010/ **cobas e** 411 analyzers |
| Calibrator | Elecsys Folate RBC CalSet | Elecsys Folate III CalSet |
| Calibration frequency | Same | Once per reagent lot and<br>• After 1 month when using same reagent lot<br>• After 7 days when using same reagent kit on the analyzer<br>• As required per QC findings or pertinent regulations |
| Controls | Commercially available whole blood control | Elecsys PreciControl Anemia |
| Traceability | Reference method is Folate III (Application on the E2010) | Reference method is the Elecsys Folate II assay |
| Reagent Stability | Unopened – Same<br>Opened – Same<br>On analyzers – 2 weeks | Unopened 2-8°C – up to expiration<br>Opened 2-8°C – 8 weeks<br>On Elecsys 2010 and cobas e411– 2 weeks |
| Measuring Range | 120 ng/mL – 620 ng/mL | 46.5 - 620 ng/mL |
| Analytical Sensitivity at Lower Limits | LoB ≤ 20 ng/mL<br>LoD ≤ 46.5 ng/mL<br>LoQ ≤ 120.0 ng/mL | LoB ≤ 19.84 ng/mL<br>LoD ≤ 46.5 ng/mL<br>LoQ ≤ 62.0 ng/mL |

Elecsys Folate RBC Test System (including Folate RBC Assay (Rack Pack), the Folate RBC CalSet and the Folate RBC CalCheck)

| | | |
|---|---|---|
| Dilution | Samples with folate concentrations above the measuring range can be diluted manually with Folate RBC Hemolyzing Reagent (ascorbic acid solution, 0.2%). The recommended dilution is 1:2. The concentration of the diluted sample must be >265 ng/mL. After manual dilution, multiply the results by the dilution factor 2. | Samples with folate concentrations above the measuring range can be manually diluted with 0.2% ascorbic acid solution. The recommended dilution is 1:2. The concentration of the diluted sample must be > 310 ng/mL. Multiply the result by the dilution factor. |
| Precision | **Elecsys 2010/cobas e411 Repeatability**<br>• Hemolysate 2, mean 155 ng/mL: SD 7.73 ng/mL; CV 5.0%<br>• Hemolysate 3, mean 272 ng/mL: SD 11.2 ng/mL; CV 4.1%<br>• Hemolysate 4, mean 527 ng/mL: SD 17.1 ng/mL; CV 3.3%<br><br>**Elecsys Modular E170/cobas e 601/602 Repeatability**<br>• Hemolysate 2, mean 191 ng/mL: SD 11.5 ng/mL; CV 6.0%<br>• Hemolysate 3, mean 258 ng/mL: SD 14.1 ng/mL; CV 5.5%<br>• Hemolysate 4, mean 580 ng/mL: SD 12.8 ng/mL; CV 2.2%<br><br>**Elecsys 2010/cobas e411 Intermediate Precision**<br>• Hemolysate 2, mean 155 ng/mL: SD 12.2 ng/mL; CV 7.9%<br>• Hemolysate 3, mean 272 ng/mL: SD 16.9 ng/mL; CV 6.2%<br>• Hemolysate 4, mean 527 ng/mL: SD 24.8 ng/mL; CV 4.7%<br><br>**Elecsys Modular E170/cobas e 601/602 Intermediate Precision**<br>• Hemolysate 2, mean 191 ng/mL: SD 12.5 ng/mL; CV 6.5%<br>• Hemolysate 3, mean 258 ng/mL: SD 15.1 ng/mL; CV 5.9%<br>• Hemolysate 4, mean 580 ng/mL: SD 19.7 ng/mL; CV 3.4% | **Elecsys 2010/cobas e411 Repeatability**<br>• Sample 1, mean 229 ng/mL: SD 12.2 ng/mL; CV 5.3%<br>• Sample 2, mean 350 ng/mL: SD 17.0 ng/mL; CV 4.9%<br>• Sample 3, mean 481 ng/mL: SD 25.7 ng/mL; CV 5.3%<br><br>**Elecsys 2010/cobas e411 Intermediate Precision**<br>• Sample 1, mean 229 ng/mL: SD 16.1 ng/mL; CV 7.0%<br>• Sample 2, mean 350 ng/mL: SD 25.2 ng/mL; CV 7.2%<br>• Sample 3, mean 481 ng/mL: SD 34.6 ng/mL; CV 7.2% |
| Analytical Specificity | Same | The following cross-reactivities were found:<br>Aminopterin 2.7%<br>Folinic acid 2.3%<br>Amethopterin 2.3% |

Elecsys Folate RBC Test System (including Folate RBC Assay (Rack Pack), the Folate RBC CalSet and the Folate RBC CalCheck)

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|---|---|---|
| Interferences | Same<br><br>Also includes the following precautionary statement for high protein samples:<br><br>• Samples with extremely high total protein concentrations (e.g. patients suffering from Waldenstrom's macroglobulinemia) are not suitable for use in this assay, since they may lead to the formation of protein gel in the assay cup. Processing protein gel may cause a run abort. The critical protein concentration is dependent upon the individual sample composition and the sample type. | • The assay is unaffected by icterus (bilirubin < 564 µmol/L or < 33 mg/dL), lipemia (Intralipid < 1500 mg/dL), and biotin < 86.1 nmol/L or < 21 ng/mL, IgG < 16 g/L and IgA < 4.0 g/L.<br>*Criterion: Recovery within ± 10% of initial value with samples >5 ng/mL and ≤ +/- 0.5 ng/mL with samples ≤ 5 ng/mL.*<br>• In patients receiving therapy with high biotin doses (i.e. >5 mg/day), no sample should be taken until at least 8 hours after the last biotin administration.<br>• No interference was observed from rheumatoid factors up to a concentration of 1000 IU/mL.<br>• In vitro tests were performed on 18 commonly used pharmaceuticals and in addition on human erythropoietin. No interference with the assay was found.<br>• It is contraindicated to measure samples of patients receiving therapy with certain pharmaceuticals, e.g. methotrexate or leucovorin, because of the cross-reactivity of folate binding protein with these compounds.<br>• In rare cases, interference due to extremely high titers of antibodies to streptavidin and ruthenium can occur. |
| Expected Values | **Whole Blood Folate (from hemolysate sample)**<br>Expected = 209-640 ($2.5^{th}$ – $97.5^{th}$ percentile)<br><br>**RBC Folate (folate in erythrocyte fraction)**<br>Expected = 499-1504 ng/mL ($2.5^{th}$ – $97.5^{th}$ percentile) | American Journal of Clinical Nutrition<br>Expected = 4.6 – 34.8 ng/mL<br>(all ages & male/female) |

Elecsys Folate RBC Test System (including Folate RBC Assay (Rack Pack), the Folate RBC CalSet and the Folate RBC CalCheck)

| (2) Elecsys Folate RBC CalSet | | |
|---|---|---|
| **Feature** | **Elecsys Folate RBC CalSet** | **Predicate Elecsys Folate III CalSet (K082340)** |
| Intended Use | Elecsys Folate RBC CalSet is used for calibrating the quantitative Elecsys Folate RBC assay on the Elecsys and cobas e immunoassay analyzers. | Elecsys Folate III CalSet is used for calibrating the quantitative Elecsys Folate III assay on the Elecsys and cobas e immunoassay analyzers. |
| Levels | Same | Two |
| Matrix | Hemolysate based master calibrators and human serum product calibrators | Human serum |
| Format | Same | Lyophilized |
| Stability | Same | Unopened: up to the stated expiration date<br>After reconstituting:<br>At 2-8C – 3 days<br>At -20C – 3 months (freeze only once)<br>Onboard: use only once |
| Composition | Same | **Buffer:** HEPES 50mM<br><br>**Preservative:** Bronidox L 0.5% |

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Elecsys Folate RBC Test System (including Folate RBC Assay (Rack Pack), the Folate RBC CalSet and the Folate RBC CalCheck)

| (3) Elecsys Folate RBC CalCheck | | |
|---|---|---|
| **Feature** | **Elecsys Folate RBC CalCheck** | **Predicate Elecsys Folate III CalCheck (K082340)** |
| Intended Use | Elecsys Folate RBC CalCheck is used in the verification of the calibration established by the Elecsys Folate RBC assay on the Elecsys and cobas e immunoassay analyzers. | Elecsys Folate III CalCheck is used for verification of the calibration established by the Elecsys Folate III reagent on the Elecsys and cobas e immunoassay analyzers. |
| Levels | Same | Three |
| Matrix | Hemolysate | Human serum |
| Format | Same | Lyophilized |
| Stability | Same | Unopened and stored at 2 – 8 C: up to the stated expiration date<br>After reconstituting: 4 hours at 20-25C |
| Composition | Same | **Buffer:** HEPES 50mM<br><br>**Preservative:** Bronidox L 0.5% |

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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Silver Spring, MD 20993

MAY 12 2011

Roche Diagnostics
C/O Ms. Kathie Goodwin
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PO Box 50416
Indianapolis, IN 46250

Re: k103716
Trade/Device Name: Roche Elecsys Folate RBC, Folate RBC CalCheck, Folate RBC CalSet
Regulation Number: 21 CFR 862.1295
Regulation Name: Folic acid test system
Regulatory Class: Class II
Product Code: CGN, JJX, JIT
Dated: April 8, 2011
Received: April 12, 2011

Dear Ms. Goodwin:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into class II (Special Controls), it may be subject to such additional controls. Existing major regulations affecting your device can be found in Title 21, Code of Federal Regulations (CFR), Parts 800 to 895. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Parts 801 and 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); and good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820). This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Parts 801 and 809), please contact the Office of *In Vitro* Diagnostic Device Evaluation and Safety at (301) 796-5450. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/cdrh/industry/support/index.html.

Sincerely yours,

Courtney Harper, Ph.D.
Director
Division of Chemistry and Toxicology
Office of *In Vitro* Diagnostic Device
Evaluation and Safety
Center for Devices and Radiological Health

Enclosure

# Indications for Use Form

510(k) Number (if known):

Device Name: (1) Elecsys Folate RBC Assay
(2) Elecsys Folate RBC CalSet
(3) Elecsys Folate RBC CalCheck

Indications for Use:

**(1) Elecsys Folate RBC Assay:** Measurements obtained by this device are used in the diagnosis and treatment of anemias on the Elecsys and cobas e immunoassay analyzers. For in vitro diagnostic use.

**(2) Elecsys Folate RBC CalSet**: Elecsys Folate RBC CalSet is used for calibrating the Elecsys Folate RBC assay on the Elecsys and cobas e immunoassay analyzers. For in vitro diagnostic use.

**(3) Elecsys Folate RBC CalCheck:** Elecsys Folate RBC CalCheck is used for the verification of the calibration established by the Elecsys Folate RBC reagent on the indicated Elecsys and cobas e immunoassay analyzers. For in vitro diagnostic use.

Prescription Use ___X___ (Part 21 CFR 801 Subpart D) AND/OR Over-The-Counter Use _____ (21 CFR 801 Subpart C)

(PLEASE DO NOT WRITE BELOW THIS LINE-CONTINUE ON ANOTHER PAGE OF NEEDED)

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Concurrence of CDRH, Office of In Vitro Diagnostic Devices (OIVD)

Carol C. Benson

Division Sign-Off
Office of In Vitro Diagnostic Device
Evaluation and Safety

510(k) K103716